

# **STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION (ECONOMIC ZOOLOGY)**

---

\*\*\*

[www.etoosindia.com](http://www.etoosindia.com)

❖ **Dogs (Huskies) 1<sup>st</sup> domesticated by Eskimos**

❖ **Methods of Animal Breeding :-**

**1. Inbreeding**

- Closely related individuals within same breed for 4-6 generations.
- Increases Homozygosity (Pure-Lines)
- Continued Inbreeding Leads to 'Inbreeding depression.

**2. Out-Breeding -**

- (a) Out cross :- Same breed individuals, not related for 4-6 generations.
- Overcomes Inbreeding depression.
  - Eg. – Sahiwal cow
- (b) Cross-breed :- Between two different breeds.
- Eg. – Hisardale
- (c) Interspecific :- Between two different species
- Eg. – Mule (male donkey & Female horse)

## Trick :-

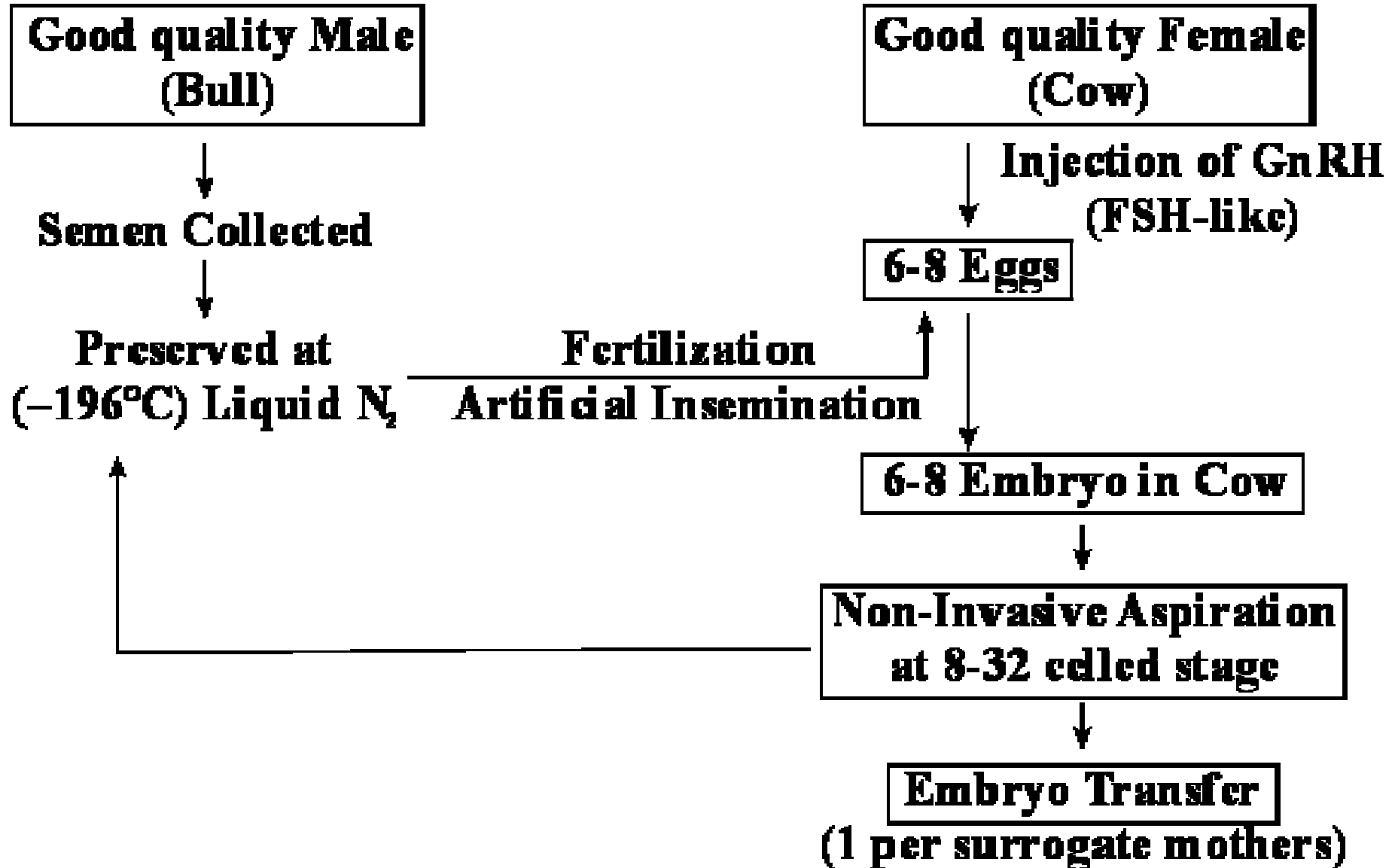
○ Mary & Bunty Sheep ko Hisar daal ao  
↓ ↓ ↓ ↓  
Marino (Male) Bikaneri (♀) sheep Hisardale

○ Mala Don't Feed Horse & Mule  
↓ ↓ ↓ ↓ ↓  
Male Donkey Female Horse (mare) mule  
(Jack)

## **Controlled Breeding Techniques :-**

1. Artificial Insemination of semen of desired male
2. Multiple Ovulation (FSH - like hormones, 6-8 eggs at a time)
3. Non-surgical aspiration of fertilized eggs at 8-32 cell stage
4. Embryo transfer into surrogate (1 Embryo in 1 Surrogate)

## AI & MO-ET Technique



## Animal

## Zoological Name

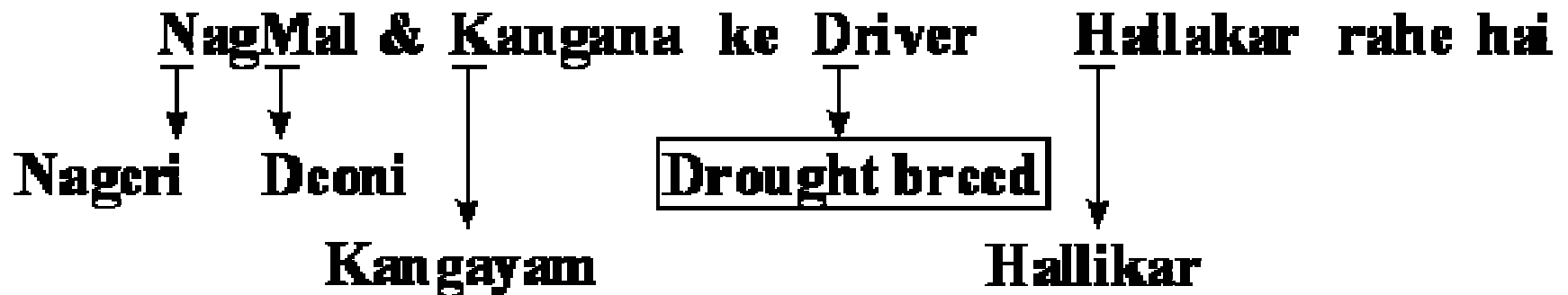
1. Goat (mutton) - Capra capra
2. Sheep (mutton) - Ovis aries
3. Pig (Pork) - Sus Scrofa (Most profitable business)
4. Horse - Equus Caballus
5. Donkey - Equus asinus
6. Camel - Camelus (Arabian -1 hump, Bactrian -2 hump)
7. Cow (♀) - Bos indicus
8. Bull (♂) - Castrated → Bullocks (low testost)
9. Buffalo - Bubalus bubalus
10. Hen/Cock - Gallus domesticus
11. Elephant - Elephas (Tusk/Upper Incisor, very long gestation period, largest land animal)

# Trick for Cow Breeds :-

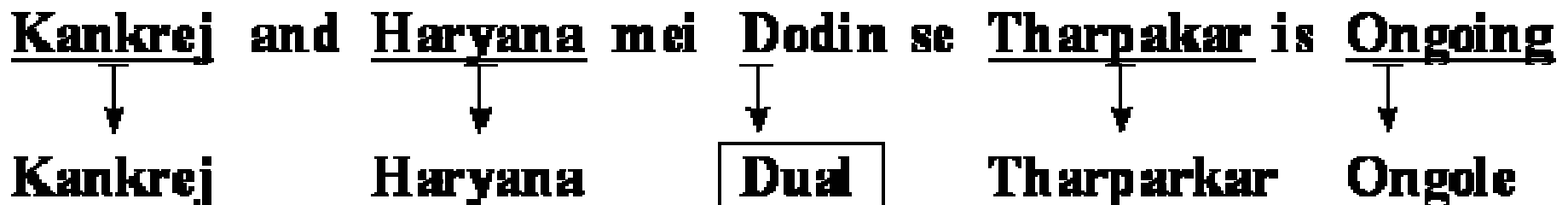
## (A) MILCH CATTLES :-



## (B) Draught Breeds :-



## (C) Dual-Purpose Breeds :-



### **Trick for Cow Breeds :-**

**(D) CROSS-BREEDS (CATTLES) :-**

**Karan-Swiss and Karan-Fries are Friends with Sunandini**  

```
graph TD; A["Karan-Swiss and Karan-Fries are Friends with Sunandini"] --> B["(Sahiwal + Brown swiss)"]; A --> C["(Tharparkar + Holstein Friesian)"]; A --> D["(H. Friesian + Sahiwal)"]; A --> E["(Local + Jersey/Holstein/ B. Swiss)"];
```

**(Sahiwal + Brown swiss) (Tharparkar + Holstein Friesian) (H. Friesian + Sahiwal) (Local + Jersey/Holstein/ B. Swiss)**

**(E) EXOTIC/FOREIGN BREEDS (Cattles) :-**

**Ayesha**      **Brown**      **Holland se Free**      mai      **Four**      **Jersey**      layi

↓                      ↓                      ↓                      ↓                      ↓

**Ayrshire**      **Brown**      **Holstein**      **Foreign**      **Jersey**  
**swiss**                      **Friesian**



### Trick for Buffalo :-

# Nili Ravi

**&**

# MuNna

## Surat

Ke

# Nili Ravi

# Murrah Nagpuri

## Surti

# BaJaar

# Mai

# Baithe

**hai**

**↓ Jafarabadi  
Bhadawari**

# Mehsana

# Buffalo

## Trick for Wool :-

Shahrukh      went to  
↓  
Shahtoosh      wool

Churu      bought  
↓  
Chiru

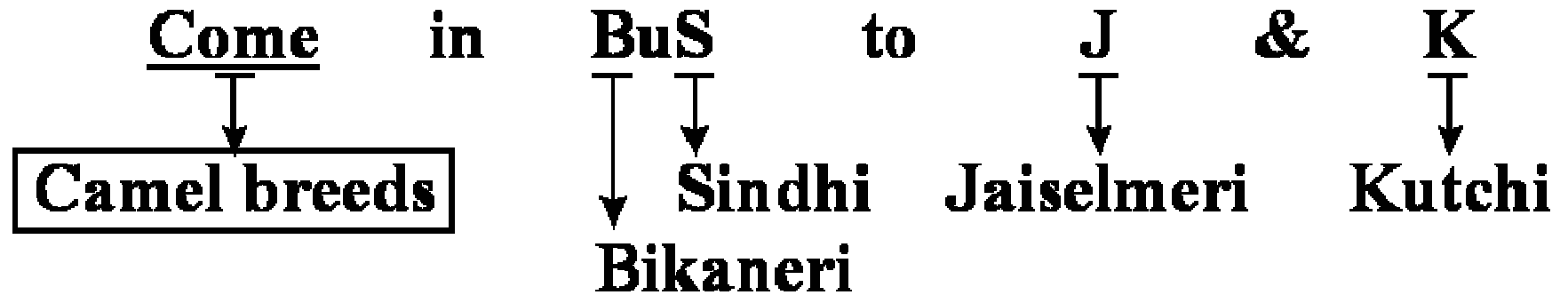
Goat      that wears  
↓  
Goat

Pashmina      &  
↓  
Pashmina wool

Rabbits      that Eats  
↓  
Rabbit

Angoor  
↓  
Angoora wool

## Trick for Camel Breeds:-



### Trick for Poultry Birds:-

**(A) Indigenous :-**

## Karaknath, Brahma & Aseel



**(Cock fighting)**

**Bus**      se      **Chittorghar**      mei      mile  
↓                          ↓                          ↓  
**Busra**                    Chittgong      ghagus

## Exotic Poultry Birds :-

White Leghorn



White Leghorn

Plays on



Plymouth rock

New Hard



New Hampshire

Red Roads of Island



Rhode Island Red

**My Brother eats Meat & Lay Eggs**  
**Broilers → meat      Layers → Eggs**

# **DISEASES :-**

- 1. Cattles**
  - **Anthrax (Bacterial)**
  - **Rinderpest/Cattle plague (Viral)**
  - **Texas/Tick/Red Water fever (Babesia Protzoa)**
- 2. Poultry**
  - **Coccidiosis (Protozoa Eimeria)**
  - **Ranikhet/New Castles Disease (Viral)**
  - **Bird f/u (viral) : Culling**
  - **Fowl cholera/ Pullorum (salmonella)/ Mycoplasmosis/Spirochaetosis (Bacterial)**
- 3. Honey bee & Silkworm**
  - **Pebrine disease (Protozoa Nosema)**
- 4. Horse**
  - **Surra ds (Protozoa T. evansi)**

## **APICULTURE/HONEY BEE REARING :-**

1. *Apis indica* (Indian bee) – most common used in India
2. *Apis dorsata* (Rock bee)
3. *Apis florea* (Little/dwarf bee)
4. *Apis mellifera* (Italian/European – best commercially bee)



# **PRODUCTS OF HONEY BEE :-**

## 1. Bee-wax (Real Product of Bees)

- Abdominal glands of worker bees

## 2. Bee Venom

## 3. Honey

pH = 6.8

- (38% Fructose/Levulose sugar +20% water + little sucrose/dextrin)
- Flower nectar + Worker Bee saliva

# Bee Dance – Karl von Frisch (Nobel Prize)



Round dance

Food source < 75m

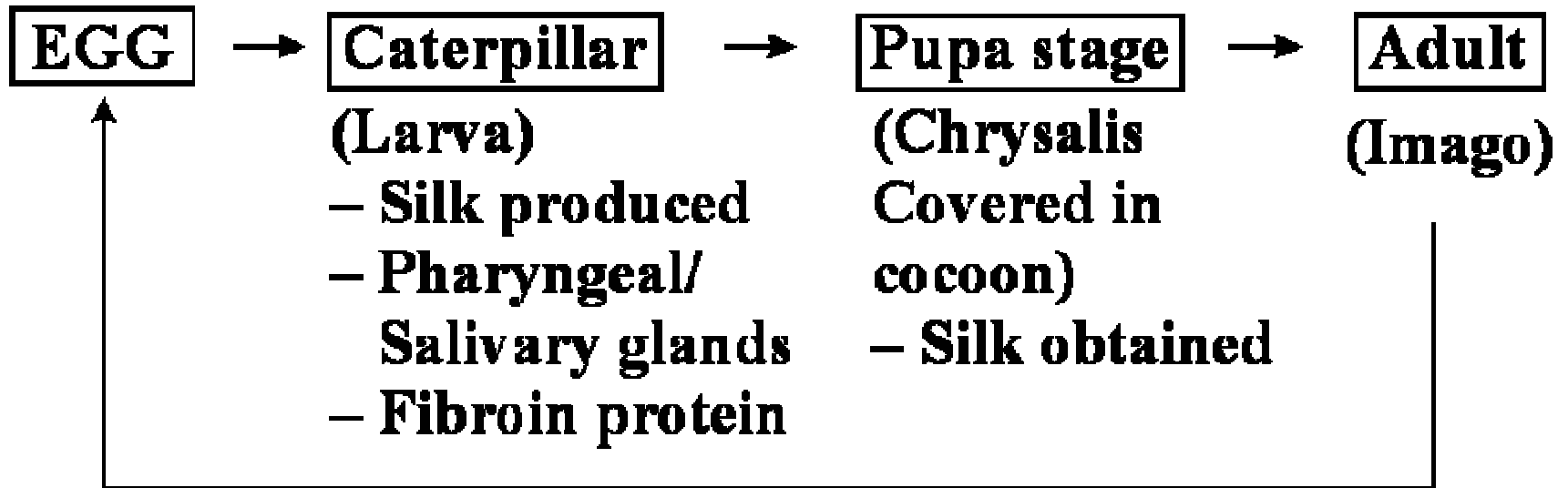
Tail – Wagging dance

> 100 mt.

<b>QUEEN</b>		<b>DRONE</b>		<b>WORKER</b>	
<b>1</b>	<b>Larger size. Generally one queen per hive</b>	<b>1</b>	<b>Smaller than queen, larger than workers. 200-300 per hive.</b>	<b>1</b>	<b>Smallest in size. Majority in numbers.</b>
<b>2</b>	<b>Diploid, fertile female</b>	<b>2</b>	<b>Haploid, fertile males, called King of colony</b>	<b>2</b>	<b>Diploid sterile female, incapable of producing eggs.</b>
<b>3</b>	<b>Legs strong, walking about on the comb. Feeds on Royal Jelly</b>	<b>3</b>	<b>Live in drone cell.</b>	<b>3</b>	<b>Live in worker cell. Pollen grains adhere to branched hair on the body. Pollen basket or corbicula on hind legs</b>
<b>4</b>	<b>Sting is curved, modified as egg laying organ called ovipositor</b>	<b>4</b>	<b>Sting and wax gland absent.</b>	<b>4</b>	<b>Asting with poison sac at the tip of abdomen.</b>
<b>5</b>	<b>Lays both fertilized and unfertilized eggs (1500-2000/day)</b>	<b>5</b>	<b>Their main function is to fertilize the female (Queen)</b>	<b>5</b>	<b>Function is to collect honey, look after young-ones, to clean comb, to defend hive, and to maintain temperature of the hive.</b>
<b>6</b>	<b>Fertilized eggs develop into females. Unfertilized eggs develop into drones.</b>	<b>6</b>	<b>Develops parthenogenetically from unfertilized egg.</b>	<b>6</b>	<b>Depending on work they do the are Nursery bees, Builders, Repairers, Cleaners and Fanners.</b>
<b>7</b>	<b>Life span 2-5 years.</b>	<b>7</b>	<b>Drones dies after copulation. (Fertilizing queen) Life span 57 days.</b>	<b>7</b>	<b>Life span 4-5 months</b>

# SERICULTURE/SILKWORM CULTURE

1. *Bombyx mori* → Mulberry tree → Mulberry Silk
2. *Antheraea paphia* → Arjuna tree → Tassar silk
3. *Antheraea Asami* → Sal tree → Muga silk
4. Life Stages :-



# **AQUACULTURE & PISCICULTURE (Only Fishes)**

- Blue Revolution (Fish)
- White Revolution (Milk)
- Green Revolution (Agriculture)

## **Common. Edible Fishes –**

### **(A) Fresh water :-**

1. Rohu (*Labeo rohita*)
2. Catla (*Catla Catla*)
3. Mrigal (*Cirrhina mrigala*)
4. Magur (*Clarius*)
5. Culbasu

Polyculture/  
Composite culture

## **(B) Marine edible Fishes :-**

1. Hilsa
2. Sardine
3. Salmon
4. Anguilla (Eel)
5. Pomphret
6. Harpodon (Bombay duck)

## **FISH PRODUCTS :-**

1. Source of Protein
2. Liver oil – Vit. – A & Vit. – D
3. Ishinglass - gelatinous, from Air bladder  
- Cement, Purify wine & beer, fitters
4. Fish meal for cattle & pultry (protein)
5. Shagreen - Shark leather